Mr. Holmes picked the implement out of a bank, among hundreds of other pebbles which surrounded it, he was attracted by its resemblance to a palæolith. If I recall our conversation at the time correctly, Holmes stated that although he believed the quartz to be a natural form, it resembled somewhat such implements. Certainly, then, this discovery is entitled to due consideration, for although the implement has been condemned by some, has it not received the approval of others who are also authorities upon the subject, among them Professors Putnam, Wright, Wilson, and Dr. Abbott.

Palæoliths have been found in the Columbian gravels at Trenton by Dr. Abbott and his son, Richard Abbott, according to the labels attached to the specimens preserved at the Peabody Museum, and presented by these gentlemen to that institution.

Two other palæoliths have been found in the Wilmington gravels by different gentlemen and are now in the Peabody Museum, Harvard University, together with the letters accompanying them. It has been suggested that they have been found in a talus. Whether this be so or not remains to be determined. I, some time ago, called attention to the fact that the old aqueous deposits in the vicinity of Wilmington have evidently been subjected to considerable disturbance (see remarks on a "Fallen Forest and Peat Layer," Bull. of Geol. Soc. Am., Vol. II.), and it may be that this took place in times comparatively recent. In fact there is a probability that this may have been even after "the ancient talus" at Trenton was deposited. I am predisposed to this opinion from the fact that during the extraction of clay from the pits at Richmond's brickyard (mouth of Naaman's Creek) leaves of oak and sycamore trees were found beneath the brick clays of Lewis, and in other portions of these excavations the more ancient and recent gravels were intermingled together among the fallen forest layers.

Implements have been found in the brick-clays just mentioned, and these are at the Peabody Museum with the records of the donors attached.

Looking over the list of finds in supposed tertiary and post-tertiary deposits, it appears that some class all of these as neolithic implements, that is, judging by the character of the implements themselves. May it not be queried, is the neolithic classification of European countries applicable to certain finds on our western continent? for it seems that some of our ancient deposits contain the handiwork of neolithic man. The antiquity of certain deposits which seem to have yielded in the majority of cases implements claimed to be of neolithic type is a question for the geologist to decide, until then arguments upon this subject have but little weight. Still, as we said in the beginning of this article, they are interesting; and, we may add, allow all concerned to express their opinions.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

On request in advance, one hundred copies of the number containing his communication will be furnished free to any correspondent.

The editor will be glad to publish any queries consonant with the character of the journal.

Natural Implements.

THERE are some things suggested by Dr. Brinton's recent article relating to early man in America, and three quotations may be made bearing on the subject of supposed primitive human art. It may be premised that no working archæologist has failed to find things of a puzzling character, those which he hesitates to retain as being of human workmanship, and yet which he is not altogether willing to cast aside. He accepts the fact, also, that many articles were so nearly fitted for man's use naturally that he often used them just as they were found.

An article, entitled "Observations on Stone-Chipping," by George E. Sellers of Illinois, prepared at Dr. Rau's request, was published in the Smithsonian Report for 1885, and is well worth reading. The various artificial processes are described, and some of the natural ones. He says: "The river-drift or gravel bars, when subjected to the grinding and crushing action of drift-logs or rolling bowlders, would furnish many suggestive forms and shapes that a little ingenuity would apply, and out of which would naturally grow the art of flaking. The streets of Paducah, Ky., are paved with partly rounded, angular, silicious gravel, mostly of jasper. Seeing heaps of this ready for spreading, I was struck by the many forms, mostly highly water-polished, that if found on a flaking ground would pass for refuse flakes and rubbish left by the workmen. On inquiry, I was informed that this coarse gravel was from banks on the Tennessee River, above the ordinary overflows. I selected many forms that any archæologist would pronounce to be the work of man."

He observed that a heavy wagon, driven over these, produced no effect on the surface gravel, but did on those lower down. "Many of the fresh fractures presented the form and appearance of genuine cores, and would be mistaken for the work of man." This led him to make an experiment by pressure, in a vessel. "On emptying the cylinder, the result was many representations of the rude implements found in the drift."

The second quotation is from a paper read by Dr. D. S. Kellogg of Plattsburgh, N. Y., at the New York meeting of the American Association for the Advancement of Science, in 1887, and entitled "Aboriginal Dwelling Sites in the Champlain Valley." "The material of which the chipped implements were made is found throughout this whole region. The so-called flint is abundant in the limestone of the locality. On Butler's Island in Lake Champlain detached pieces of the dark and striated flint, a foot or more in diameter, are so driven against each other by the action of the waves that their surfaces resemble the roughened surfaces of ordinary flint hammers."

The third quotation relates to the same lake, and will be found in the "Jesuit Relation" of 1668. The French had come within two miles of the Ticonderoga River. "Here we halted, without knowing why, until we observed our savages gathering from the shore pieces of flint, nearly all cut in shape." Then follows an Indian superstition connected with this customary gathering. "The occasion for this ridiculous story is the fact that the lake is often swept by severe storms, which cause high waves, particularly in the bay where Sieur Corlart, of whom we have spoken, perished, and when the wind comes from across the lake it casts upon the shore quantities of flint ready to strike fire."

There is one supposed trace of early man in New York that seems injudiciously used. Near the summit of the Lake Ridge, in the town of Gaines, was a spring, and in sinking a well on the spot traces of fire were found at the depth of eighteen feet. It is assumed that a fire was built on the beach when the lake was receding, and that it was buried in some way by the waters below it, under nearly twenty feet of soil. How this curious geological action was brought about is not explained. To produce such a deposit the waters should have risen above the fire, not fallen away from it. The probable solution might be that a fire was built in a ravine by a stream; that the ravine was filled in, turning the stream into a spring; and that other natural processes followed. That the lake could have buried the fireplace thus deep is clearly impossible. The depth by itself, however, is nothing very rare; but a field archæologist soon learns to distrust evidence of this nature. In some cases known to the writer, early villages and lodges, standing on open ground exposed to the wind, were buried in the sand, and the forest grew over them. The forest was cleared away all around, and the wind, with a wider sweep, carried the sand away again.

W. M. BEAUCHAMP.

Baldwinsville, Nov. 4.

Jealousy of a Dog.

IN an article in *Science* of Oct. 28, Mr. Stevenson remarks upon the jealousy of infants. Would you not place an infant of ten months upon a higher standard of development than a dog? Yet dogs are jealous. My brother owned one, a well-grown, bright fellow, who was usually upon excellent terms with my kitten but showed jealousy if the kitten was petted in his presence. On one occasion I held the kitten in my arms and pur-

posely patted and praised it while the dog's eyes kindled ominously at the pretended neglect of himself. Suddenly the kitten jumped from my arms to the floor, and before I could interfere the dog had seized and shaken its little life out of it. I mention this as simply an instance. I believe that even birds show jealousy and sulk if too much notice is given a mate or a rival.

L. L. H.

BOOK-REVIEWS.

A Treatise on Plane and Spherical Trigonometry. By EDWARD A. BOWSER, LL.D. Boston, D. C. Heath & Co., 1892.

THE different treatises in Dr. Bowser's series of text-books are all characterized by an abundance of well-selected exercises. For class-room use this is a commendable feature. The accompanying texts, however, are often open to some criticism; they partake too much of the nature of compilations. It can be asserted that all such works are compilations to a greater of less extent, but such a claim is not always just. An author may go over the whole ground, making himself thoroughly familiar with his subject, then condense his materials, classify carefully, present in a comprehensive manner, allowing himself to be governed in all this work by well known pedagogical principles. Against a text-book prepared in this way this charge could not, in justice, be brought. In a prospectus issued along with the trigonometry, his publishers state that Dr. Bowser is accustomed to bring out, on the average, one new volume a year. Whether such a feat is a matter of pride on the part of the publisher or the author does not appear. At any rate, it furnishes an explanation of the weakness as well as the strength of the series.

As a general rule, a presentation of a science which varies greatly from the historic development is likely to be more difficult to master than one which does not. Some authors of trigonometries actually reverse the natural order. If the student could commence just where Hipparchus commenced, with the relation between arcs and chords, and be shown the advantage in the use of a table of chords, and then led from that to a table of sines and thence to the other functions, the subject would be learned in its true bearing from the start. It is true trigonometry was for centuries regarded merely as an introduction to astronomy, the result being that the spherical part was developed abnormally. But from the days of Regiomontanus (Cantor, II., p. 242) it was studied as an independent science and grew accordingly. As topics in a natural treatment of plane trigonometry we might have: Arcs and chords; chords and sines; sines and the other functions; these functions in the solution of right triangles, exercises; solution of oblique triangles by dropping perpendiculars, exercises. Principle of continuity; angles and functions in other quadrants; fundamental relations between the functions; derived relations. Addition and subtraction formulæ, including all formulæ which are easy consequences. Cases in the solution of oblique triangles, with exercises, deriving appropriate formulæ as needed. Logarithms; solution of triangles by logarithms, model arrangements, exercises. Solution of trigonometrical equations, De Moivre's theorem, and such other topics as it may be thought best to insert. It is a grave pedagogical mistake not to use the natural tables first, and until the student is made to *feel* the need of some labor-saving system. The use of the functions and the use of the logarithms are entirely distinct, and should be well separated from each other in the mind of the beginner. The natural tables were calculated to fifteen decimal places the century before Napier invented his logarithms. To sum up in one sentence, there should be more of historical evolution in the presentation of trigonometry.

Let us test the plane portion of the present work by the principles suggested. After giving the ratio definitions of the functions first, the student is plunged into the generalized conception of arcs and functions. Next the addition formulæ are given and all their corollaries, which means a considerable part of theoretical trigonometry. Next, logarithms and the log-function tables are

CALENDAR OF SOCIETIES.

Chemical Society, Washington.

Nov. 10.—F. P. Dewey, Crystallized Sulphite of Zinc; W. D. Bigelow, On the Viscosity of Sorghum Juices. Mr. Dewey's paper first reviewed the literatures of sulphite of zinc from Berthollet (1789) to Deniges (1892), showing that most of the early investigations were occupied with the complex action of SO_2 on metals, in which the production and examination of sulphite of zinc was merely an incident, and while some had produced the sulphite by the direct union of ZnO and SO_2, only a few had produced it by double decomposition. Two formulæ have been announced. The first $ZnSO_3$ $2H_2O$ was proposed by both Muspratt and Forclos and Gelis in 1843, upon meagre analytical data, followed, in 1844, by Dr. Koene with quite satisfactory results. In 1845, Rammelsburg announced the formula as $2\,ZnSO_3$ $5\,H_2O$, which was supported by Marignac, in 1857, in an elaborate and complete examination. Finally, in 1892, Deniges somewhat arbitrarily announced that the formula must be $2\,ZnSO_3$ $5H_2O$. Mr. Dewey's first results, which were all obtained by dissolving ZnO in SO_2 water, clearly and unmistakably supported the earlier (1-2) formula, but, on repeating Denige's work, the later formula (2-5) was obtained. Finally, from the same solution of ZnO in SO_2 water, both salts were obtained. By allowing the SO_2 to go off slowly, a crop of small, powdery crystals was obtained, showing the 2-5 formula. The mother-liquor from this salt was heated to drive off SO_2 quickly, when quite large and distinct crystals were obtained, which gave the 1-2 formula, thus showing that the salt crystallizes with two proportions of water, and that both formulas are correct. It was also found that sulphite of zinc heated with free access of air is completely decomposed and yields an oxide carrying less than 0.01 per cent of sulphur. W. D. Bigelow read a paper on the Viscosity of Sorghum Juices. About one hundred juices of different specific gravity were taken and the amount delivered by a 50 cubic centimeter pipette was carefully weighed. This was deducted from the true weight of 50 cubic centimeters of the juice and the result taken as loss due to viscosity. From this it was estimated that a 50-cubic centimeter pipette would deliver from 49.5 to 49.9 cubic centimeters of the juice. It was also noticed that the most varying results were obtained from different juices of the same specific gravity.

Biological Society, Washington.

Nov. 19.—Theobald Smith, On Certain Minute (Parasitic?) Bodies within the Red Blood Corpuscles; C. W. Stiles, The Topographical Relations of the Excretory Canals of Cestodes; David White, A Walchia from New Mexico; F. M. Webster, Some Entomological Factors in the Problem of Country Fences; F. V. Coville, Comparative Value of Plants in Determining Floral Zones.

Appalachian Mountain Club, Boston.

Nov. 9.—John Ritchie, Jr., The State Park on Temple Mountain, N.H.; John Coleman Adams, The Brook Path up Chocorua.